



What Happened to Our Right-of-Way?

A Report on the Encroachment
Problem Within B.C. Hydro's
Gas Transmission Rights-of-Way

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B. C. HYDRO

WHAT HAPPENED TO OUR RIGHT OF WAY?

A Report on the Encroachment Problem
Within B. C. Hydro's Gas Transmission Rights of Way.

April 1985

Prepared By: Properties Services Dept
Properties Division

For: Gas Operations Group
Gas System Operations
Department

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1. INTRODUCTION

B. C. Hydro, through its Gas Operations Group, supplies natural gas to the Lower Mainland. The gas is purchased from Westcoast Transmission at Huntingdon, south of Abbotsford, and is distributed through a high pressure gas pipeline system serving approximately 350,000 customers.

Extensive urban development has taken place along the gas pipeline routes since they were built in the 1950's. As a result of the subdivision of large rural parcels the pipeline right of way can become a significant part of a small lot. Usually residential property owners want to use their land to the fullest by improving their backyard. In many cases this results in encroachments onto the gas transmission right of way, such as sheds, pools and large trees. Encroachments can pose a safety hazard and impede reliable operation and maintenance of the pipeline system.

It is the purpose of this report (a) to describe the prevailing encroachment problems within the B. C. Hydro system; and (b) to outline initiatives to reduce existing and prevent future encroachments. The report supplements B. C. Hydro's video presentation entitled, "What Happened to Our Right of Way?" being presented to municipalities affected by the pipelines.

2. THE PIPELINE RIGHT OF WAY

Gas transmission pipelines are contained within statutory rights of way.¹ Most of the rights of way were acquired by easement so that B. C. Hydro obtains certain rights to use the land, but ownership remains with the landholder with certain restrictions as to use. B. C. Hydro's rights to use the right of way are based on the agreement with individual property owners. There are various types of right of way agreements depending on individual circumstances and Hydro's perceived requirements at the time of acquisition.

The right of way width is usually 15.2 to 18 m (50 to 60 ft). Large diameter gas transmission pipelines, from 168 to 1067 mm (6 to 42 inches) operate at 4020 kilopascals (585 pounds per square inch) and are buried at a depth of approximately 1.2 m (4 ft). There are two to three pipelines within the right of way in some areas.

The total length of the gas transmission right of way, as illustrated in Figure 1, is 172 km crossing 12 Lower Mainland municipalities (including Anmore - Ioco/GVRD). A breakdown of this total distance for each municipality is provided in Table 1. The

¹ There are also trunk and distribution pipelines operating at lower pressures located within road allowances.

table shows that the majority of the right of way is located in three municipalities: Surrey 46 km, Langley 37.2 km and Delta 20.7 km. Together these three municipalities accommodate 60% of the right of way.

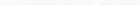
A further breakdown in Table 1 gives the right of way length for major zoning categories. As can be seen, urban type zoning comprise 61.3% of the right of way, with residential being most significant (39.7%). It is in existing and future residential areas that pressures to encroach upon the right of way are most intensive.

TABLE 1

B. C. HYDRO GAS PIPELINE RIGHT OF WAY
ZONING BY MUNICIPALITY

	Breakdown by Zoning									
	Residential		Industrial		Commercial/ Institutional		Agricultural		Length in Each Municipality	
	km	%	km	%	km	%	km	%	km	%
Abbotsford	0.3	0.2	0.3	0.2	-	-	5.1	2.9	5.7	3.3
Coquitlam	6.8	3.9	1.7	1.0	2.4	1.4	-	-	10.9	6.3
Delta	5.3	3.1	13.0	7.5	0.8	0.5	1.6	0.9	20.7	12.0
GVRD (Anmore - Ioco)	1.4	0.8	1.2	0.7	0.1	0.1	4.0	2.3	6.7	3.9
Langley	12.1	7.0	0.8	0.4	0.2	0.1	24.1	14.1	37.2	21.6
Maple Ridge	7.7	4.5	2.0	1.1	1.4	0.8	-	-	11.1	6.4
Matsqui	0.4	0.2	0.3	0.2	1.0	0.6	11.9	7.0	13.6	8.0
Pitt Meadows	0.6	0.3	0.1	0.1	0.2	0.1	4.6	2.7	5.5	3.2
Port Coquitlam	0.3	0.2	3.7	2.2	0.4	0.2	0.6	0.3	5.0	2.9
Port Moody	-	-	-	-	-	-	1.3	0.8	1.3	0.8
Richmond	-	-	1.7	1.0	-	-	6.7	3.9	8.4	4.9
Surrey	33.5	19.5	4.7	2.7	1.2	0.7	6.6	3.8	46.0	26.7
TOTAL	68.4	39.7	29.5	17.1	7.7	4.5	66.5	38.7	172.1	100.0



 PIPELINE ROUTE
 MAJOR PIPELINE STATIONS (eg. LIVINGSTONE)
 MUNICIPAL BOUNDARIES

PD 6369

3. THE ENCROACHMENT PROBLEM

Encroachments are defined as the use of the right of way or easement in contravention of the terms of the right of way agreement. This section describes the prevailing encroachment situation by addressing potential safety hazards, recent B. C. Hydro investigations and problematic subdivision practices along the right of way.

3.1 The Hazards of Encroachments

Encroachments cause difficulty in maintaining the stringent safety and operational standards for gas pipelines. It has been shown in the previous section that about 60% of the right of way lies in areas zoned for urban use. Property owners want to use their property to its maximum, which may cause encroachments which in turn reduces the identity of the right of way. With the loss of a clear identifiable right of way the risk of accidents increases. The main source of accidents is pipeline rupture as a result of third party damage during construction and excavation activities within the right of way. A pipeline rupture could require evacuation or initiate an explosion causing extensive property damage and even loss of life.

For example, In Alberta in 1979, 19,000 people had to be evacuated from an Edmonton suburb due to a propane pipeline rupture caused by third party damage. As a result new legislation and by-laws have been established restricting development near pipelines. Fortunately, no major incident has yet occurred in the Lower Mainland.

Therefore it is mandatory that a clearly marked right of way is preserved in order to remind the public continuously of the presence of a high pressure natural gas pipeline. If encroachments are not controlled, the identity of the right of way would be lost successively and the risk of an accident would increase.

Additionally, safe operation of the pipeline system requires site inspections, gas leak detection surveys and corrosion monitoring. Tests for gas leaks and corrosion are important and they can only be undertaken adequately with an accessible right of way. Corrosion tests, in particular, require uninterrupted access along the pipeline. With encroachments in the right of way these tests cannot be undertaken properly.

3.2 Magnitude of the Encroachment Problem

In order to identify the magnitude of the encroachment problem within gas transmission rights of way an encroachment inventory was compiled in 1983. This inventory is being constantly updated as land is developed and as encroachments are removed. As of October 1984, there were 2086 parcels within the 172 km transmission system, 831 or 40% are affected by one or more encroachments. As documented by Table 2, there are a total of 1008 encroachments on these 831 parcels. Trees create the largest number of encroachments totalling 677 or over 60% followed by sheds and small buildings with 176 or close to 20%. There are also 25 pools within the right of way. Surrey has 43% of all parcels on the right of way and correspondingly the highest number of the encroachments (451 or 44.7%). Other municipalities with a significant number of encroachments are Langley, Maple Ridge and Delta. Maple Ridge appears to have the highest incidence of encroachments, i.e. the number of encroachments is high relative to the number of parcels (17.4% versus 9.3%). A map atlas has been prepared which shows the pipeline right of way and encroachments.

TABLE 2

B. C. HYDRO GAS PIPELINE RIGHT OF WAY
TYPES OF ENCROACHMENTS BY MUNICIPALITY

Municipality	Type of Encroachment						Total No. of Encroachments		Total No. of Parcels	
	Buildings /Sheds	Decks/ Carports	Pools	Trees*	Storage	Fill	No.	%	No.	%
Abbotsford				1	1	1	3	0.3	38	1.8
Coquitlam	1		1	19	2		23	2.3	98	4.7
Delta	21	5	3	80	6		115	11.4	228	10.9
GVRD (Anmore)				12	2		14	1.4	20	1.0
Langley	25	2	1	127	13	14	182	18.0	389	18.6
Maple Ridge	31	5	7	112	9	11	175	17.4	194	9.3
Matsqui	5			15	5	4	29	2.9	114	5.5
Pitt Meadows				3			3	0.3	16	0.8
Pt. Coquitlam				3	1		4	0.4	42	2.0
Port Moody				1			1	0.1	2	0.1
Richmond	1			7			8	0.8	44	2.1
Surrey	92	11	13	297	25	13	451	44.7	901	43.2
Total	176	23	25	677	64	43	1008	100.0	2086	100.0

NOTE: Table 2 shows total number of encroachments. e.g. a parcel with a shed, deck, pool and trees (may be more than one tree) would be counted as four encroachments.

Table 3 shows number of properties with encroachments. Some properties have more than one encroachment, thus accounting for the different totals in the two tables.

Data as of October 1984.

Further research was undertaken to identify zoning for each of the parcels with an encroachment in order to determine where most of the problems occur. The findings are shown in Table 3, which indicates that most encroachments (over 80%) occur in residentially zoned areas. It is the present and future residential areas which have to receive the utmost attention in reducing the encroachment problem. Most of the encroachments in Anmore/Ioco, Matsqui and Richmond are on rural-agriculturally zoned lands.

A land use study was undertaken in 1983 which identifies properties with future development potential that could pose future encroachment problems. The study found that a number of properties on the pipeline network have potential for higher density development. It was estimated more than 700 residential lots could be created along the right of way in the next 10 years. Surrey, Langley and Maple Ridge would see most of this growth. The study recommended that preliminary subdivision applications which include Hydro rights of way should be referred consistently to B. C. Hydro for comment.

Following the inventory and land use study a third study compared B. C. Hydro right of way management practices with those of other pipeline companies in North America. Eighteen companies were interviewed: eight from Canada and

TABLE 3

B. C. HYDRO GAS PIPELINE RIGHT OF WAY
PARCELS WITH ENCROACHMENTS BY MUNICIPALITY

<u>Municipality</u>	<u>Number of Parcels with Encroachments by Zone</u>				<u>Total</u>
	<u>Residential</u>	<u>Industrial</u>	<u>Commercial/ Institutional</u>	<u>Agricultural</u>	
Abbotsford	1	1	-	1	3
Coquitlam	20	2	-	-	22
Delta	76	16	2	-	94
GVRD (Anmore-Ioco)	1	-	-	12	13
Langley	115	3	1	36	155
Maple Ridge	113	8	8	-	129
Matsqui	9	-	2	16	27
Pitt Meadows	-	1	-	2	3
Port Coquitlam	-	4	-	-	4
Port Moody	-	-	-	1	1
Richmond	-	-	-	8	8
Surrey	344	19	6	3	372
TOTAL	679	54	19	79	831

NOTE: Table 2 shows total number of encroachments. e.g. a parcel with a shed, deck, pool and trees (may be more than one tree) would be counted as four encroachments.

Table 3 shows number of properties with encroachments. Some properties have more than one encroachment, thus accounting for the different totals in the two tables.

Data as of October 1984.

ten from the United States. The findings indicated that many of the problems facing B. C. Hydro are similar in nature to those of other companies. In general, the approaches taken are similar to what B. C. Hydro is doing, although the study showed the magnitude of the problem is significantly greater here. For example, some jurisdictions require utility comment and approval on subdivisions involving rights of way. Some local governments in Canada and the United States require building setbacks from the right of way. Seven of the utilities contacted have public awareness programs.

3.3 Subdivision of Land

A principal cause of encroachments stems from subdivision practices in the Lower Mainland. Usually developers wish to maximize the number of lots allowable under the area zoning and by-laws. The result has been the creation of residential subdivisions where the right of way is fully subdivided and a substantial portion of the backyard of each lot is taken up by the easement thereby creating a limited building envelope abutting the right of way.

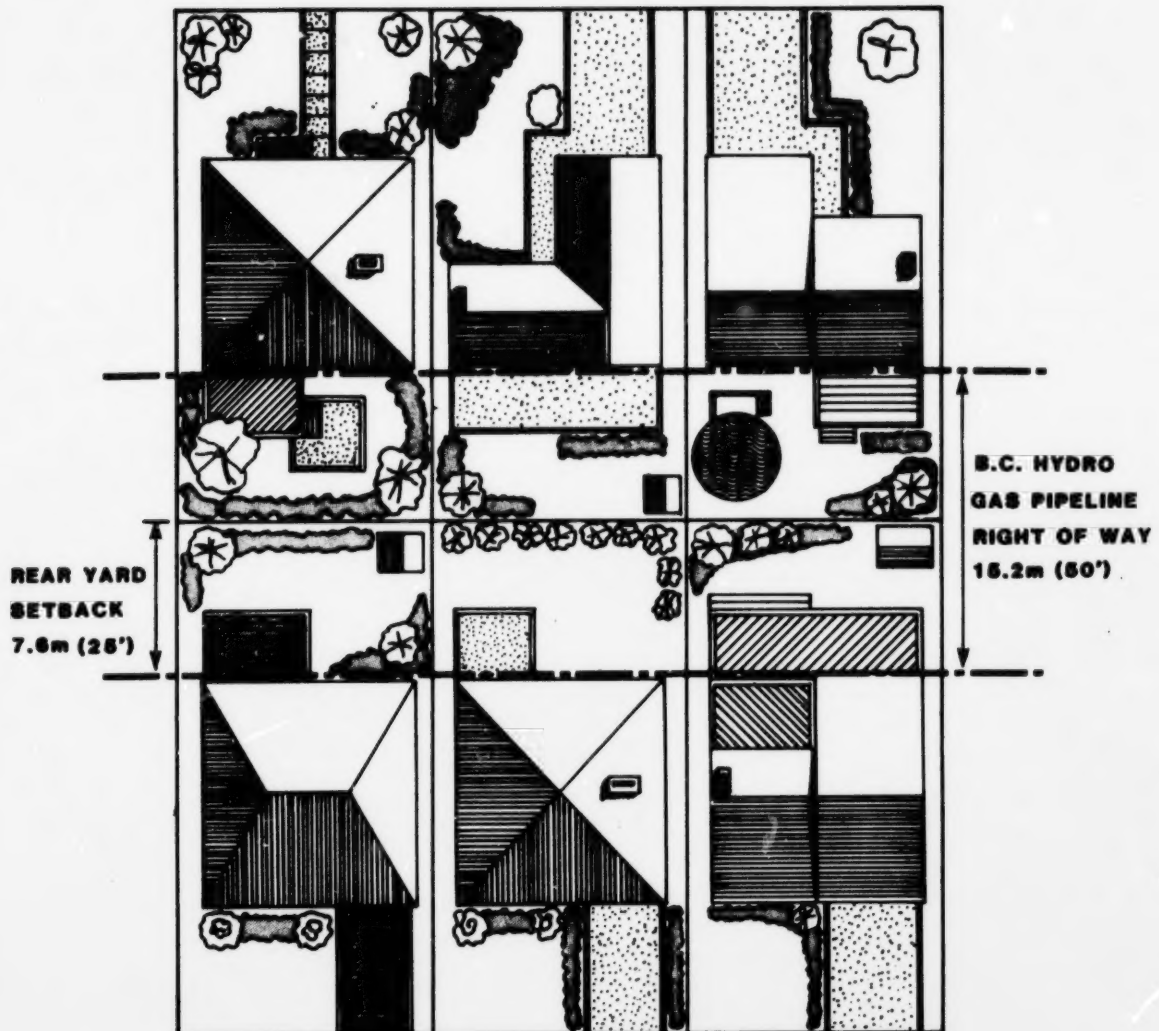
The location of buildings on a lot is determined by setback distances as stated in local subdivision by-laws. A typical subdivision example of a standard lot (15.2 m x 30.4 m) is

shown in Figure 2. The average right of way width is 15.2 m (50 ft) and a common rearyard setback is 7.5 m (25 ft).

This configuration allows buildings to abut the right of way boundary. Consequently, the whole backyard is located in the right of way. This severely limits use of the backyard which is effectively an "outdoor room", with solariums, sundecks, patios, pools and terraces acting as transition places between indoor and outdoor living. It is, therefore, not surprising that encroachments in the backyard are quite common. Figure 3 illustrates a recent subdivision along the gas right of way which exemplifies the problem.

FIGURE 2

BUILDING CONSTRUCTION ABUTTING THE RIGHT OF WAY

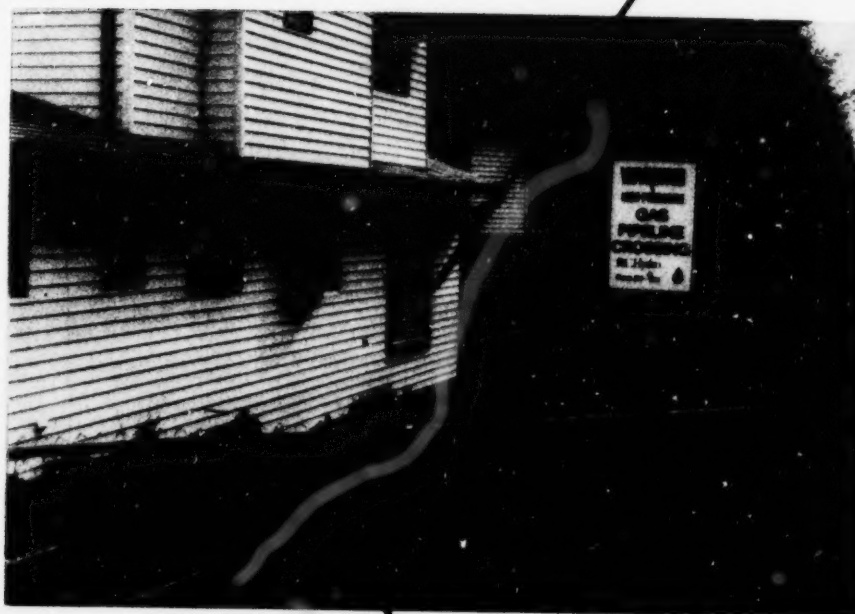


This figure shows housing abutting the Right of Way. The result is that any improvements in the backyard such as decks, sheds and swimming pools constitute encroachments.

FIGURE 3

A HOUSE IN LANGLEY ADJACENT
TO THE GAS PIPELINE RIGHT OF WAY

Note how patio doors back onto Right of Way.



Gas Right of Way Boundary

Example in Langley of a house constructed abutting the Right of Way. The new owner may eventually want to extend a deck or other structure onto the Right of Way.

4. RIGHT OF WAY MANAGEMENT

The maintenance of the right of way in order to achieve safe and reliable operation is an ongoing process. As urbanization continues an increasing number of encroachments can be expected and effective measures will be necessary to minimize land use conflicts along the right of way to avoid damage to the pipeline. Responding to these needs an extensive program of maintaining public awareness and preventing encroachments is being instituted by B. C. Hydro as described below.

4.1 Public Awareness Program

The public awareness program is designed to more clearly identify the location of the right of way, and to provide information about the right of way to those who live along it, or who may work on or adjacent to it.

(a) Pipeline Markers

The location of the buried pipeline within the right of way is clearly identified by orange marker posts and signs. Markers are located at all road crossings and at some property boundaries. The number of markers is being increased as areas are developed to urban uses.

(b) Surveys and Posting Plans

In acquiring rights of way, a legal survey is required to locate the right of way on the property. A legal survey plan is prepared and the right of way is identified by survey monuments on the property. At some future time the property may be subdivided. There is no requirement to install survey monuments at the intersection of the right of way and the property boundaries of the newly created lots; and property owners find it difficult to establish the extent of the right of way on their property. Hence, in 1982 B. C. Hydro initiated a program whereby right of way boundaries are being identified in the field by setting additional monuments. The monuments are set by a professional land surveyor at the intersections of the property boundaries of newly created parcels with the right of way. Posting plans are then deposited in the Land Title Office. This program assists in making property owners aware of the right of way and enables them to clearly identify the right of way boundary on their property.

(c) Public Presentations

B. C. Hydro staff are meeting with local government officials; and plan to meet with others involved with the development of land to make them more aware of encroachments on the right of way. A video of the right of way forms a major part of these presentations.

(d) Public Brochure

A brochure entitled "A Guide to Using Gas Transmission Pipeline Rights of Way" describes acceptable and non-acceptable uses on the right of way as well as uses requiring the written permission of B. C. Hydro. The brochure is general and not intended to supercede the right of way agreement. This brochure is being provided to property owners, contractors, land surveyors, developers and others who may be interested in, or affected by the right of way.

(e) Maintenance of Right of Way Records

A computerized record of all properties along the right of way, traditionally called a "line list", has been established using data from field work, B. C. Hydro

files, the B. C. Assessment Authority and the Land Title Office. The records are updated regularly. By doing so, new owners can be informed immediately about the presence of the right of way on their land, and the rights and obligations associated with it.

4.2 Encroachment Prevention

Encroachment prevention is designed to identify and remove encroachments and to ensure the right of way is protected by planning for appropriate future development nearby.

(a) Right of Way Patrol

Through the use of aerial and vehicle patrols B. C. Hydro staff attempt to identify encroachments and have them removed as soon as possible. Helicopter patrols fly the system weekly. Any unfamiliar activity is reported to the Pipeline Right of Way Engineer at the Fraser Valley Gas Office to determine if the work is authorized. If the work is not authorized, a representative is sent out to assess the situation and stop work, if necessary.

(b) Contact with Land Owner

Based on the encroachment inventory described in Section 3.2, each property with an encroachment has been identified. Land representatives have been assigned to contact the respective property owners and inform them about the right of way agreement. As a result of these contacts a total of 132 encroachments were removed in 1984.

(c) Permits

Property owners are required to consult with B. C. Hydro before making certain uses of the right of way. In this way property owners can be informed of the permitted uses and the appropriate permits issued. Crossings of the pipeline require permits under the Pipeline Act.

(d) Subdivision Referral

It is important that new subdivisions of properties involving a gas pipeline right of way be referred to B. C. Hydro. Although some subdivisions have been submitted in the past B. C. Hydro is asking for further cooperation from municipalities to ensure that new subdivisions do not impede safe operation of the

pipeline system. B. C. Hydro will process subdivisions referred to them as efficiently as possible in order to not delay the approval process.

(e) Subdivision Guidelines

Present subdivision practice in many cases ignores the presence of the gas pipeline right of way. There are situations when the right of way can be beneficially incorporated into a subdivision. For example, the right of way can be used for recreational or public purposes (e.g. bicycle paths, walkways), parking lots in industrial/commercial areas, or as a buffer to separate different land uses.

Early consultation with B. C. Hydro staff on subdivision layout is advisable. A set of subdivision guidelines is currently being prepared by B. C. Hydro to assist in the design of subdivisions that involve gas transmission rights of way.

(f) Municipal Liaison

B. C. Hydro intends to liaise more closely with municipalities and their respective planning and engineering departments. Existing by-laws and subdivision proce-

dures should be re-examined and necessary changes instituted to meet municipal concerns and pipeline safety standards.

B. C. Hydro has maps available showing the pipeline rights of way and areas with development potential which are available to municipalities for their reference.

5. CONCLUSIONS

Encroachments are a significant problem that affect the maintenance of the gas pipeline. They also increase the risk of an accident due to loss of identity of the right of way. Most encroachments occur in residential areas. As new residential development takes place the potential for encroachments increases. Present subdivision design contributes to encroachments, since the right of way often comprises the entire backyard of a property.

Hydro is taking action to remove encroachments where possible, and to eliminate the possibility of future encroachments. A major part of this program is to increase public awareness of the risks of encroachments to the pipeline. Hydro wants to work cooperatively with municipalities to find ways to reduce the potential for encroachments in new residential areas.

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